

S.B. 1042 – Oppose (Section 1): Insufficient Specifications and Transparency

Government Administration and Elections Committee

Testimony – March 9, 2015

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Chairs and members of the Committee, my name is Luther Weeks. I am a Computer Scientist, and a Certified Moderator. Since 2007, I have lead citizen observation and independent reporting for fourteen (14) major post-election audits. I have personally observed ninety-nine (99) local audit counting sessions across Connecticut.

Although well-intended, S.B.1042 would effectively eliminate post-election audits.

In 2007, just prior to statewide use of optical scanners, the General Assembly passed our current audit law, embodied in statute section 9-320f. Since that time the science of auditing has progressed substantially. We have learned many valuable lessons in the shortcomings of our current law and in its implementation.

Through public funds and a U.S. Election Assistance Commission grant, the Secretary of the State (SOTS) and UConn under Dr. Alex Shvartsman have created and tested a machine auditing tool which if fully developed and supported in law, could be the basis for stronger, more efficient audits, providing justified confidence in our elections. Sadly the potential of our investment in machine assisted auditing has yet to be realized.

Included in my testimony is a summary by world leading experts in the field of post-election audits, describing the procedural requirements for credible, transparent machine assisted audits. And why common methods of machine auditing, like those demonstrated by the SOTS Office/UConn fall short. (*)

Included in my testimony is a summary of a paper co-authored by the SOTS Office and UConn describing and recommending how electronic auditing can easily be accomplished with their tool. (**). Their method falls short of the requirement of the leading experts. In a demonstration of the equipment to this Committee last spring, Dr. Shvartsman confirmed publicly that he agreed with my assessment of the inadequacy of the methods used in the demonstrations.

This bill calls for procedures and training, administered by the SOTS, for registrars to perform machine assisted auditing. You should not leave it to the Secretary and the registrars to create and implement sufficient procedures, without a structure in law that guarantees sufficient procedures, provides public verifiability, and enforcement.

As you are likely aware procedures created by the Secretary of the State are not enforceable. As you may not be aware, the current audit law has proven insufficient to provide credible post-election audits: Unenforceable procedures created by the SOTS are frequently not followed by registrars. The procedures themselves are inadequate. Also lack of action and omissions by the SOTS Office and UConn have resulted in post-election audits that are insufficient to provide public credibility. (***)

See my testimony on S.B. 1041 for a law providing publicly verifiable, credible machine assisted audits.

Thank you.

(*) General Concerns with Electronic Auditing and the SOTS Office/UConn System

Summary of Concerns

- Unlike other audits, to be credible, post-election audits require *public verifiability*.
- The SOTS Office/UConn system, as previously demonstrated, does not provide public verifiability.
- The SOTS Office/UConn method of visual review does not provide effective verification, even by officials, let alone public verifiability.

The need for Publicly Verifiable Audits:

- Unlike other audits, post-election audits are not independent. They are conducted by the same officials who are responsible the elections, who specify the election equipment, who developed the auditing system, and who select vendors to program the scanners.
- Unlike financial audits, such as bank audits or campaign finance audits, because of the secret vote, there are no independent records similar to bank statements which can be compared with other financial records of the entity being audited. Election audits must be compared against the paper ballots held by election officials.
- Thus, election audits and recounts must be conducted publicly and transparently, providing for public verification. Without that they cannot be trusted. Without that they cannot provide credibility for our elections, that is, credibility for our democracy.

Additional Concerns with S.B. 1042

- This bill requires no public participation, observation, or involvement to provide public confidence and credibility or feedback to the Legislature.
- There is no independent technical evaluation of the technology and methods developed by the SOTS Office/UConn required in the law.
- There is no proposed method for effective verification, even by officials.
- The method claimed by the SOTS Office to provide verification, consists of election officials watching images on a screen and comparing them to vote counts displayed concurrently with each image as they pass by quickly on a monitor. There is no proof that such a method would detect any errors between the actual ballots and the cast vote records since:
 - The vote counts are not required to be compared to the actual ballots
 - The actual cast vote records are not inspected and independently totaled. They are not saved. They are deleted at the end of each batch of ballots counted by the system.
 - No proof that typical election officials, could spot differences of any given rate of error (e.g. .5%, 1%, 2% etc.) while images and counts pass by for ballots with many votes on each ballot. There is every reason to assume they would not spot many differences -- especially given that officials can be expected to believe that the system is better at reading the ballots than they are.

Machine Retabulation is not Auditing

Mark Lindeman, Ronald L. Rivest*, and Philip B. Stark

24 March 2013

- A **post-election vote tabulation audit** checks election results by manually inspecting some voter-verified records (usually paper ballots). A well-designed audit can produce strong evidence that election outcomes are correct—and can correct incorrect outcomes.
- The principle of **evidence-based elections** says that an election should provide convincing evidence that election outcomes are correct. True audits allow observers to see directly how well the voting system performed, which can provide such evidence.
- Some claim that election results can be checked by **machine retabulation**, in which ballots are rescanned on other equipment. Machine retabulation may happen to catch some errors, but it is not really an audit. Machine retabulation relies on the false assumption that two machines can't *both* be wrong.
- Some claim that retabulation adequately checks the voting system because it is “independent” of the voting system. But a retabulation system could be misconfigured in the same way as the voting system, could misinterpret some ballots in the same way, or could be subverted to cause it to report the same incorrect results. Two unaudited machine counts are not necessarily better than one.
- Some claim that retabulation can adequately check the voting system results provided that the two sets of vote counts match in sufficient detail. This is like claiming that if two expense reports list the same expenses, both must be right and there is no reason to look at any receipts.
- Some claim that retabulation itself can be “audited” by comparing ballot images produced by the retabulation system with the system's interpretation of those images. At best, this tests internal consistency: whether two parts of the retabulation system agree with each other. It does not test whether the system correctly interpreted the ballots. At worst, a subverted retabulation system could pass this test, yet misreport *every* vote. This is not an audit. It cannot confirm that the election outcome is correct.
- A well-designed retabulation system can help in a **machine-assisted audit**. In a machine-assisted audit, the retabulation system produces an interpretation of votes on each ballot (a Cast Vote Record, or CVR) that can be matched with that ballot. The CVRs are exported from the retabulation system. Observers verify that these exported CVRs produce the same electoral outcome (winners, etc.) as the voting system. Then observers compare a random sample of actual ballots against the corresponding CVRs. *This comparison is between actual ballots and CVRs, not between digital images of ballots and CVRs.* A machine-assisted audit can produce strong evidence that election outcomes are correct. Retabulation cannot, even if the CVRs are checked against the digital images of the ballots.
- There is currently no way to audit votes cast online, and there is little prospect for the foreseeable future. Despite claims about “military grade encryption,” Internet voting does not create a durable, voter-verifiable record against which the results can be checked. While votes cast on the Internet could be retabulated, they cannot be audited. Both NIST and the Department of Homeland Security agree that secure online voting does not currently exist, and—if it is possible at all—is a long way off.

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() Computer Assisted Post-Election Audits (SOTS/UConn paper)**

Extend Abstract: <http://voter.engr.uconn.edu/voter/wp-content/uploads/AS-2013.pdf>

The introduction of electronic voting technology in Connecticut necessitated the development of new policies and procedures by the Secretary of the State (SOTS) Office to safeguard the integrity and security of the new electoral process. Forming a partnership with the University of Connecticut, SOTS Office developed a comprehensive approach that extended the existing electoral procedures to incorporate the use of the new optical scan electronic voting equipment. The new procedures include pre- and post- election audits of the voting equipment programming, and hand-counted post-election audits in 10% of randomly selected districts. Observing that the hand-counted audits are expensive, time-consuming, labor-intensive, and error-prone, it was decided to explore a semi-automated approach to post-election ballot audits. A semi-automated approach was chosen over a completely automated one due to the risks and inadequacy of the latter. Supported by the U.S. EAC and the State of Connecticut, an Audit Station was developed for the purpose of conducting computer-assisted post-election audits. The Audit Station speeds up the audit process, increases audit accuracy, and most importantly, empowers the human auditors to have complete control over the audit down to the interpretation of each voted bubble." In essence, the Audit Station does not take the place of a hand count, but augments it by presenting scanned ballot images with useful data for the auditors to consider or to contrast with the physical paper ballots. The system is also auditable; upon the completion of the audit it exports the recorded ballot interpretations and the overall results that allow direct comparison with physical ballots and independent validation. The system is implemented using inexpensive commercial off-the-shelf components, and is equipped with a projector that enables the auditors (and the public) to easily observe the audit process and to control and override it as necessary. The system was recently used in successful pilots in four Connecticut municipalities.

While it is true that *"The system is also auditable; upon the completion of the audit it exports the recorded ballot interpretations and the overall results that allow direct comparison with physical ballots and independent validation"* the actual use of that feature would need to be incorporated into law and evaluated by experts to determine if sufficient steps were taken not only to audit the "system" but also to validate sufficiently and transparently each audit the tool was used to validate.

The paper describes the recommended check as follows:

The audit of each batch can be done in one of two modes: (1) a batch is scanned automatically, then the ballot interpretations are browsed by the auditors, so that each ballot interpretation is examined and revised by the auditors as needed, or (2) the ballots in the batch are scanned one at a time, with the audit station pausing after each ballot, to let the auditors observe the results of the scan for each ballot. The first process is faster, while the second process provides an easier way for comparing the results of the automatic interpretation to the physical ballots.

Unfortunately, there is no proof that such a scheme would result in the typical election official actually identifying a small number of errors (e.g. .5%, 1%, 2%) in one contest in a large number of ballots with a typical number of contests, observed quickly as they go by on a screen.

I contend any legitimate, independent, peer-reviewed test of typical election officials in a typical environment would not support such a claim. Test subject would need to believe that the "machine is highly accurate", with supportive claims from the SOTS Office, and believing a history of past accuracy reported by peers, would show they would not detect many, if any errors in a volume of ballots over several hours, especially when the actual errors were concentrated in batches late in the day.

(*)** In a demonstration of the SOTS/UConn system to the GAE Committee held on March 24, 2014, Dr. Shvartsman verbally agreed with contention of Luther Weeks that there is no such proof. Unfortunately, there is no known transcript or recording of that presentation, nor of my question and Dr. Shvartsman's answer.